Greetings and welcome to the **AUGUST 2015** edition of the WDFW Climate News Digest. Here you will find highlights of relevant climate change news, events and resources for WDFW staff. Feedback or suggestions for items to include in future editions are much appreciated – many *thanks* to those who have sent links and references and please keep them coming. Note that previous editions of the newsletter are now stored on the Habitat Program Sharepoint site and on the agency's climate change web page.

WHAT'S HAPPENING AT WDFW?

Climate Change and the State Wildlife Action Plan

The Draft WDFW State Wildlife Action Plan is now available for public review. This federally required document identifies species of greatest conservation need, the threats facing them and the actions needed to conserve them. Chapter 5 provides a summary of a **climate vulnerability assessment** conducted for both the species and habitats highlighted in the plan. Every species was evaluated and assigned a rank, based on inherent sensitivity, the degree of climate change exposure and the relative confidence in the reference literature available. Species which ranked high in terms of vulnerability as well as confidence have been placed on a preliminary **climate watch list.** For these highly vulnerable species, the next step is to evaluate the degree that climate change will exacerbate existing threats, and/or where actions can have an added resilience benefit and to integrate that information into conservation planning and priorities. Appendix C includes a narrative description and references for the climate vulnerability rank for each of the species of greatest conservation need. For more information, check out the draft plan or contact Lynn Helbrecht.

**Thanks to the North Pacific Landscape Conservation Cooperative for funding support for this project, and EcoAdapt for content development.*

Are you working on a project that may be affected by climate change? Have you considered or included climate change in research proposals, workshops or other activities? Please be in touch to share your experience!

LEARNING OPPORTUNITIES

August 21, *Workshop*, Portland, OR. Beaver Restoration Workshop

Join us for an intensive half-day symposium for the recently released, state-of-the-science manual regarding the use of beaver to restore streams. We will walk through the manual and describe its use in stream restoration, including assessment tools for determining how, where, and when to use beaver in stream restoration

September 15th, 3:00-4:30, Webinar, "The drought and the blob", Nick Bond, Washington State Climatologist

This webinar is organized by Paul Pickett, as part of the climate science network at the Department of Ecology. Please be in touch with Paul for more information or sign up info.

November 3-5, 2015, 6th Annual Northwest Climate Conference

** Registration is now open**

The NW Climate Conference annually brings together more than 250 researchers and practitioners from around the region to discuss scientific results, challenges, and solutions related to the impacts of climate on people, natural resources, and infrastructure in the Northwest. It is the region's premier opportunity for a cross-disciplinary exchange of knowledge and ideas about regional climate, climate impacts, and climate adaptation science and practice.

CLIMATE ADAPTATION AT OTHER ORGANIZATIONS

The California Coastal Commission Releases the Recommended Final Draft of the Sea Level Rise Policy Guidance

The Sea Level Rise Policy Guidance provides an overview of best available science on sea level rise for California and recommended steps for addressing sea level rise in Coastal Commission planning and regulatory decisions. Recommended Final Draft includes updates to reflect newly developing science, tools, and resources for sea level rise adaptation planning.

San Francisco Bay Living Shorelines Project Monitoring Report available

The State Coastal Conservancy (www.scc.ca.gov) and multiple state, federal, and non-profit partners constructed native oyster and eelgrass beds as part of an innovative habitat restoration and climate change adaptation pilot project constructed in summer 2012 in San Francisco Bay. Working with landowners, The Nature Conservancy and the CA Department of Fish and Wildlife, the project builds upon 50 year regional goals for the restoration and protection of subtidal habitats in the bay (www.sfbaysubtidal.org). Early results are providing critical information about the potential benefits of using natural reefs along the shoreline to protect habitat in the face of sea level rise and climate change.

RESOURCES

NASA and U.S. Geological Survey Joint Project: National Blue Carbon Monitoring System

A joint project between NASA and the U.S. Geological Survey is working to link remote sensing data to estimate coastal wetlands carbon stocks using available data sets and field collected data from six sentinel sites around the U.S. One can keep informed about this 3-year project, the project team, and their results with the recently launched NASA Blue Carbon Monitoring System website. The Carbon Monitoring System is poised to fill a missing gap in "blue carbon" accounting by providing a national-scale data framework to integrate and extrapolate field measurements that support national greenhouse gas inventory requirements and testing data needs for quantification of stock-based changes in coastal wetland sediments and vegetation.
Click here to view the site and learn more.

EPA National Water Program Develops Handout Summarizing its Climate Change Adaptation Tools

EPA's National Water Program has developed a handout summarizing the tools developed by the agency for state, tribal, and local governments and others to adapt their clean water and drinking water programs to a changing climate. Tools include, among others, a Storm Surge Inundation and Hurricane Strike Frequency Map; a Workbook for Developing Risk-Based Adaptation Plans; a Flood Resilience Guide for Water and Wastewater Utilities; and a National Stormwater Calculator with Climate Scenarios.
Click here to download the handout.
Click here to access the handout and other climate change and water resources.

Guidebook on Using Beavers to Restore Streams, Wetlands, and Floodplains Updated and Released

The North Pacific Landscape Conservation Cooperative has partnered with the U.S. Fish and Wildlife Service, NOAA, Portland State University, and the U.S. Forest Service to develop a comprehensive guide on using beaver for stream restoration. The goal of this guidebook is to provide an accessible, useful resource for anyone involved in using beaver to restore streams, floodplains, wetlands, and riparian areas. It

provides a practical synthesis of the best available science, an overview of management techniques, and case studies from throughout the western United States. The information contained in the guide is meant to inform decisions on fish and wildlife habitat restoration and management, range land improvement, wetland management, mitigation, transportation system planning and maintenance, and water management.
Click here to view the Guidebook and learn about an upcoming related workshop.

NOAA Map Viewer on Sea Level Rise

This map viewer from NOAA's Office of Coastal Management illustrates the scale of potential coastal flooding for various amounts of sea level rise. Water levels are shown as they would appear during the highest high tides.

CLIMATE SCIENCE NEWS

August Washington State Climatologist newsletter is now available

Topics include: a review of the warm July weather, temperature and precipitation outlook, drought update, a comparison of historical summer maximum and minimum temperatures. Also attached as a pdf. Please direct any questions or comments to climate@atmos.washington.edu.

New study narrows the gap between climate models and reality

(from Science Daily)
A new study addresses an important question in climate science: how accurate are climate model projections? Climate models are used to estimate future global warming, and their accuracy can be checked against the actual global warming observed so far. Most comparisons suggest that the world is warming a little more slowly than the model projections indicate. Scientists have wondered whether this difference is meaningful, or just a chance fluctuation.

Climate Prediction Center Releases New Report on El Nino

The Climate Prediction Center has released a new report on the El Nino Southern Oscillation. The report issues an 'El Nino Advisory', stating 'El Nino conditions are present', 'Positive equatorial sea surface temperature (SST) anomalies continue across most of the Pacific Ocean' and that 'There is a greater than 90% chance that El Nino will continue through Northern Hemisphere winter 2015-16, and around an 80% chance it will last through early spring 2016."
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/lanina/enso_evolution-status-fcsts-web.pdf

2014 State of the Climate Report

In 2014, the most essential indicators of Earth's changing climate continued to reflect trends of a warming planet, with several markers such as rising land and ocean temperature, sea levels and greenhouse gases – setting new records. These key findings and others can be found in the State of the Climate in 2014 report released online today by the American Meteorological Society (AMS).
Highlights here: State of the Climate 2014 highlights

CO2 decrease caused by global recession

From Science Daily
Research indicates the 11 percent decrease in climate change-causing carbon dioxide emissions in the US between 2007 and 2013 was caused by the global financial recession -- not the reduced use of coal.

SPECIES AND HABITATS

Ocean changes are affecting salmon biodiversity, survival

The biodiversity of two Northern Pacific salmon species may be at risk due to changes in ocean conditions at the equator, reports a study by the University of California, Davis. In the study published in the journal *Proceedings of the National Academy of Sciences* Aug. 3, researchers tracked the survival of Chinook and coho salmon from hatcheries in North America between 1980 and 2006. Before the 1990s, ocean survival rates of Chinook and coho salmon varied separately from each other. However, the researchers were surprised to find that survival rates of the two species have since become increasingly similar.
D. Patrick Kilduff, Emanuele Di Lorenzo, Louis W. Botsford, Steven L. H. Teo. *of the National Academy of Sciences*, 2015; 201503190 DOI: 10.1073/pnas.1503190112

Changing climate lengthens forest fire season

From Science Daily
Over a 35-year period, the length of forest fire seasons worldwide increased by 18.7 percent due to more rain-free days and hotter temperatures, according to research. The study examined weather data from 1979 through 2013 to determine how a changing climate impacts forest ecosystems.

Detecting Mismatches of Bird Migration Stopover and Tree Phenology in Response to Changing Climate

New Southwest Climate Science Center research examines patterns of migratory bird abundance and tree flowering in five habitat types of the Madrean Sky Islands of Arizona. Phenological synchrony and overlap were used to detect mismatches between migratory bird stopovers for food and the life cycle events of trees that provide habitat for the insects the birds eat.

New study exposes negative effects of climate change on Antarctic fish

From Science Daily
“The combination of elevated levels of carbon dioxide and an increase in ocean water temperature has a significant impact on survival and development of the Antarctic dragonfish (Gymnodraco acuticeps), researchers have discovered”.

Mangroves help protect against sea level rise

From Science Daily
“Mangrove forests could play a crucial role in protecting coastal areas from sea level rise caused by climate change, according to new research. Scientists did leading-edge mathematical simulations to study how mangrove forests respond to elevated sea levels. Taking New Zealand mangrove data as the basis of a new modelling system, the team were able to predict what will happen to different types of estuaries and river deltas when sea levels rise”.

Study shows tropical fish genetically adapting to cope with warmer waters

From the Sydney Herald, Lucy Cormack
“In an Australian-led study, researchers examined the genes of coral reef fish and the way they responded after many generations living at higher temperatures predicted under climate change. "What we've known from recent studies is that some fish in particular are able to improve their performance at higher temperatures if both the offspring and their parents have been under the high temperatures," said Professor Philip Munday, a report author from the ARC Centre of Excellence for Coral Reef Studies. They found significantly higher levels of metabolic gene activity in fish exposed to higher temperatures for two generations, as well as higher levels of immune and stress genes in the second generation. Professor Munday said the fish are essentially "switching certain genes on and off".

Expanded West Coast Guide to Olympia Oyster Restoration and Conservation

Access the guide at www.oysters-and-climate.org. A qualitative evaluation of 28 embayments along much of the range of the species identifies the areas at risk due to low population sizes or unreliable recruitment, and characterizes patterns of exposure to stressors. The most frequently encountered stressors were sedimentation and predation. Competition, cold water temperatures, warm air temperatures, and freshwater inputs were also common concerns at many bays. The guide also summarizes the results of quantitative site evaluations incorporating oyster attributes and environmental conditions conducted at six estuaries in California and Oregon to prioritize sites for conservation value and restoration potential. Finally, we have prepared an online site evaluation tool (available at www.oysters-and-climate.org)

POLICY AND MANAGEMENT - MITIGATION AND ADAPTATION

Protecting Vulnerable Communities from Climate Change

The Obama Administration has announced a new set of actions to support low-income and other vulnerable communities in preparing for the impacts of climate change.

Resilience AmeriCorps will help communities plan and implement efforts necessary to become more resilient to shocks and stresses, including extreme weather and other impacts of climate change. Through the pilot program, AmeriCorps VISTA members will serve in up to 12 communities in 2015-2016 to support the development of resilience strategies that will both help communities better manage the unavoidable and avoid the unmanageable. AmeriCorps VISTA members will build volunteer networks to carry out program initiatives, and create education and outreach materials to strengthen awareness and citizen engagement in low-income communities.